

Further comment

To the Editor,

Thank you for the opportunity to respond to Dr. Ebrahim's letter. We have carefully analyzed his comments and suggestions for modification. Unfortunately, his comments ignore the heart of the problem. Unvalidated medical tests of any sort must not be used for either clinical or forensic purposes, and certainly must not be presented in court as scientific evidence.

Dr. Ebrahim writes in his response to our letter that he never claimed these tests were diagnostic for sleepwalking.

"No where in this article have I said that these features are themselves diagnostic nor stated that they are sensitive or specific for the diagnosis."

In fact, Dr. Ebrahim repeatedly portrays the use of these procedures as providing a distinct advantage for his group in evaluating sleepwalking as opposed to other cases evaluated elsewhere. The general impression received from the article is that this battery of tests is a powerful and generally accepted diagnostic method. Dr. Ebrahim clearly promotes his battery of sleep studies as the way to make the diagnosis of sleepwalking. The following comments from the original article do not support his response:

1. ***"In the forensic arena objective criteria become more important, to make it clear in court that this defense is not one which has just been dreamed up optimistically by the defendant"*** (page 221, right column, 2nd line from bottom).
2. ***"The following findings on the PSG indicate a higher likelihood for Sleepwalking:"*** (page 222, left column, 22 lines up from bottom).
3. ***"In addition, he showed all the features indicating a tendency to sleepwalking..."*** (page 223, left column, 17 lines from bottom).
4. ***"None of the previously reported cases had the three night protocol of investigation, including the use of provocative tests, which in this case provided an opportunity to thoroughly assess and diagnose all possible aspects of the condition."*** (page 223, right column, 6 lines from top).

As noted above by Dr. Ebrahim, he believes the results of these tests provide "objective criteria" that

can be used to demonstrate in court that the defendant is a real sleepwalker and is not just making a false claim. This is the essence of a diagnostic procedure. If these techniques were not employed for their diagnostic and/or forensic value, then why were they used?

Dr. Ebrahim does acknowledge in his letter that based on current sleep medicine research findings (1) arousals from Slow Wave Sleep, (2) fragmented first Slow Wave Sleep period or (3) Hypersynchronous Delta Waves are **not** consistent with a "tendency", "increased likelihood" or "diagnosis" of sleepwalking. He suggests the following sentence to describe the relationship between sleepwalking and these sleep EEG features:

"They are in no way diagnostic of sleepwalking and remain of interest for future research."

This statement puts him in agreement with part of our previously noted position. In this sentence, Dr. Ebrahim acknowledges that he now believes that only a finding of a full-blown sleepwalking episode would be diagnostic. As we have previously noted, even a full-blown sleepwalking episode in the sleep laboratory would not be useful for determining if the defendant was in a sleepwalking state at the time of the criminal sexual act. It is impossible to recreate the circumstances that were present on the night of the criminal act. Sleep studies are not the equivalent of blood or DNA left at the scene of a crime. Sleep, sleep architecture, sleep disorders and the factors that influence them change over time. Any behaviors noted in the sleep laboratory would represent only the defendant's current state. Additionally, there has been no report of any type of complex, parasomnic behavior in alcohol related cases similar to this one. We are familiar with the results of sleep studies in two other recent alcohol induced sleepwalking trials in the United Kingdom in which defendants completed the 3-study battery as well as with other alcohol related cases reported in the media. Dr. Ebrahim states that the purpose of the studies is to recreate the conditions that were present at the scene of the crime, but in his reports only refers to the number of arousals, and sometimes other sleep EEG diagnostic markers that he now disavows.

Additionally, we reject Dr. Ebrahim's statement that these EEG features are found more frequently in sleepwalkers than in other groups. There is no scientific evidence to support this statement. In fact, studies in which patients with parasomnias were compared to patients with other

sleep disorders clearly indicate that these EEG findings have no predictive value for sleepwalking.

We were astonished by Dr. Ebrahim's assertion that the *Journal of Forensic and Legal Medicine* (Formerly *Journal of Clinical Forensic Medicine*) published the wrong version of his manuscript. Having served as peer reviewers for hundreds of scientific articles as well as in editorial roles for a variety of scientific journals, we have never heard of such an error. We, quite frankly, find these claims mystifying and disturbing.

Despite the admission that the EEG features noted in his article are not diagnostic of sleepwalking, Dr. Ebrahim persists in his claims that his provocative procedures are still somehow valuable and essential in forensic settings. He has not withdrawn comments that his procedures are generally accepted, common and frequently in use. In fact, we are unaware that these procedures have ever been employed by any other investigator in even a single case, clinical or forensic.

We wish to reemphasize that the author and his colleagues invented this set of tests expressly for forensic purposes without a scintilla of scientific validation. No normative data exist. This procedure has gone from the imagination of its creators directly to the courtroom, skipping the required studies to determine its validity, reliability, replicability, specificity, sensitivity and other required features. Absent these data, such testing can provide absolutely no useful clinical or forensic information.

Although Dr. Ebrahim has retreated substantially from his claims, he has not gone far enough. Scientific evidence must be based on valid, reliable, and reproducible scientific research and methods. The research and methods should be published and replicated by other scientists. This article is misleading to both the medical and legal communities. Juries should not be permitted to hear unsubstantiated and discredited evidence derived from these procedures.

We also wish to reaffirm the fact the sexual behavior can occur during sleep as part of a sleepwalking or confusional arousal episode. Based on the limited clinical history present, we are not at this time disputing Dr. Ebrahim's clinical findings. However, this case report lacks essential detail. There is no clear statement as to the quantity of alcohol the defendant in this case consumed, what his blood alcohol level was at the time of his sexual behavior or what his prior pattern of drinking or sleep might have been. High levels of alcohol are more consistent with gross intoxication than sleepwalking. Lower levels of alcohol might have resulted in an increase in the quantity of Slow Wave Sleep. However, as there are no sleep laboratory studies of the effects of alcohol on known clinically diagnosed

sleepwalkers, the assumed relationship depends on unsubstantiated anecdotal reports only.

Dr. Ebrahim's letter has thus reaffirmed and reinforced our original position. The battery of sleep studies performed by Dr. Ebrahim and his group has no basis in science or clinical practice. It has gone through none of the required processes for validation. It cannot and should not be presented in court as scientific evidence. We renew our call to the editor and editorial board of the *Journal of Forensic and Legal Medicine* (Formerly *Journal of Clinical Forensic Medicine*) to officially withdraw this article. We strongly encourage Dr. Ebrahim to provide the requisite rigorous scientific validation of this technique prior to its use in the clinic or courtroom.

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